

## **EXHIBIT 2**



# GEO

Engineering Services  
Instrumentation Monitoring  
Report for the Arecibo Municipal Solid Waste Landfill

Prepared by GEO-Engineering Services, Inc.  
Under Contract No. G-100-17-0001, dated March 16, 2018.

PO Box 270328

San Juan

PR, 00927

T. 787.781.6340

F.787.706.0183

José C. Zayas, PE  
Landfill Technologies Corp.

PO Box 1322  
Gurabo, Puerto Rico 00778  
Tel. 787-273-7639, e-mail: [jczayas@landfillpr.com](mailto:jczayas@landfillpr.com)

Geotechnical  
engineering

Construction  
materials testing

Re: Instrumentation Monitoring for  
Municipal Solid Waste Landfill  
Arecibo, Puerto Rico  
(GEO-853-2014)

Dear engineer Zayas:

As part of the monitoring program being conducted at Arecibo's municipal solid waste landfill, on January 10, 2018, we performed a site visit for taking readings of inclinometers installed along the landfill northern portion and observe the area's ground conditions after Hurricanes Irma and María hit Puerto Rico in September 2017.

Below is a summary of the instrumentation readings that have been taken to date:

#### Instrumentation Readings Summary

ID No.	Type	Installed by	Number of Readings
I-2 (Bor. 5)	Inclinometer	GEO-Engineering	1
I-3	Inclinometer	GEO-Engineering	11
I-4	Inclinometer	GEO-Engineering	7

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Below are our comments on the readings and site visit. The summary of the inclinometer readings and plots are attached.

- Inclinometer I-2 (Bor. 5) was installed in August 2017 to substitute previous inclinometer I-2 which was broken (see written communication of August 21, 2017). The reading of January 10, 2018 is the first reading taken from this inclinometer after the base reading. The January 10, 2018 reading indicates that no significant ground movements have developed in this area between months August 2017 to January 2018. Additional readings will be required to confirm this condition.
- The reading from inclinometer I-3 is consistent with the previous readings and continues to indicate that the inclinometer casing has maintained minor deformations in the downslope direction between the depths of approximately 11 ft and 15 ft. Based upon the boring log for this inclinometer (boring B-3), the casing has deformed within solid waste found between an upper layer of fill and the underlying in-situ soil. As a result, the detected deformation is probably due to buckling of the inclinometer casing caused by vertical and/or lateral deformations developing within the solid waste. The maximum deflection reached by the inclinometer casing in almost seven years of monitoring is less than  $\frac{1}{8}$  of an inch. No cracks were observed at the ground surface surrounding the inclinometer that would indicate that large lateral movements were occurring within the ground.
- The reading from inclinometer I-4 shows a downslope deformation at a depth between 11 ft and 15 ft, near the contact between the existing upper fill and underlying solid waste. However, when compared with the previous reading of May 2017, the maximum casing deformation is practically the same. The detected deformation is probably due to buckling of the inclinometer casing caused by vertical and/or lateral deformations developed within the fill and/or solid waste. The maximum deflection reached by the inclinometer casing in close to four years of monitoring is of approximately 0.30 inches. No cracks were observed at the ground surface that would indicate that large lateral movements were occurring within the ground.

Previous readings of inclinometer I-4 showed an upslope deformation at a depth of 3 ft. The reading from January 10, 2018 showed that the upslope deformation had apparently halted. Additional readings will be required to confirm if the lateral deformations at this depth have stopped.

A visual inspection of the landfill northern area was conducted during the site visit. No signs (e.g. cracks, scarps, bulging, etc.) were observed that would indicate problems of instability along the landfill northern slope, which could be associated with the Hurricane María's rainfall.

The next inclinometer readings will be performed in **July 2018**. If you have any questions to these findings, please do not hesitate to contact us.

Cordially,  
**GEO-Engineering**



Carlos Felipe Rodríguez, MS, PE, MBA  
Geotechnical Engineer

C:\Users\GEO11\AppData\Local\EgnyteWebEdit\temp\JHY6LJ853-AreciboMSW-Monitoring-Reading 10enero18-16mar2018.docx



**FIGURE 1**

**INSTRUMENTATION MONITORING FOR  
ARECIBO'S MUNICIPAL LANDFILL  
ARECIBO, PUERTO RICO**

Schematic Location of Inclinometers at Project Site

Arecibo's Municipal Landfill  
Inclinometer No. 2A (Bor. 5)

1/10/2018

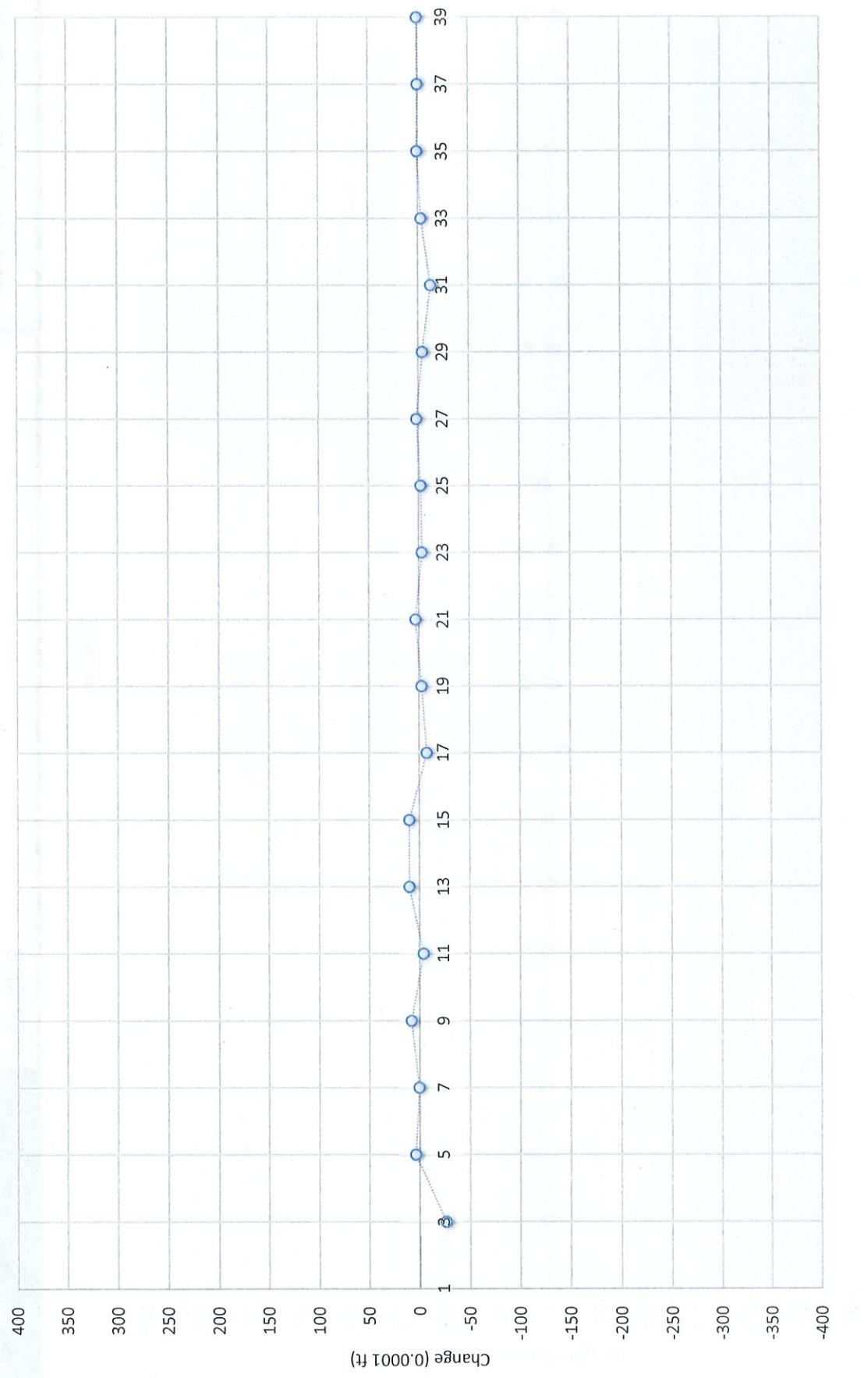


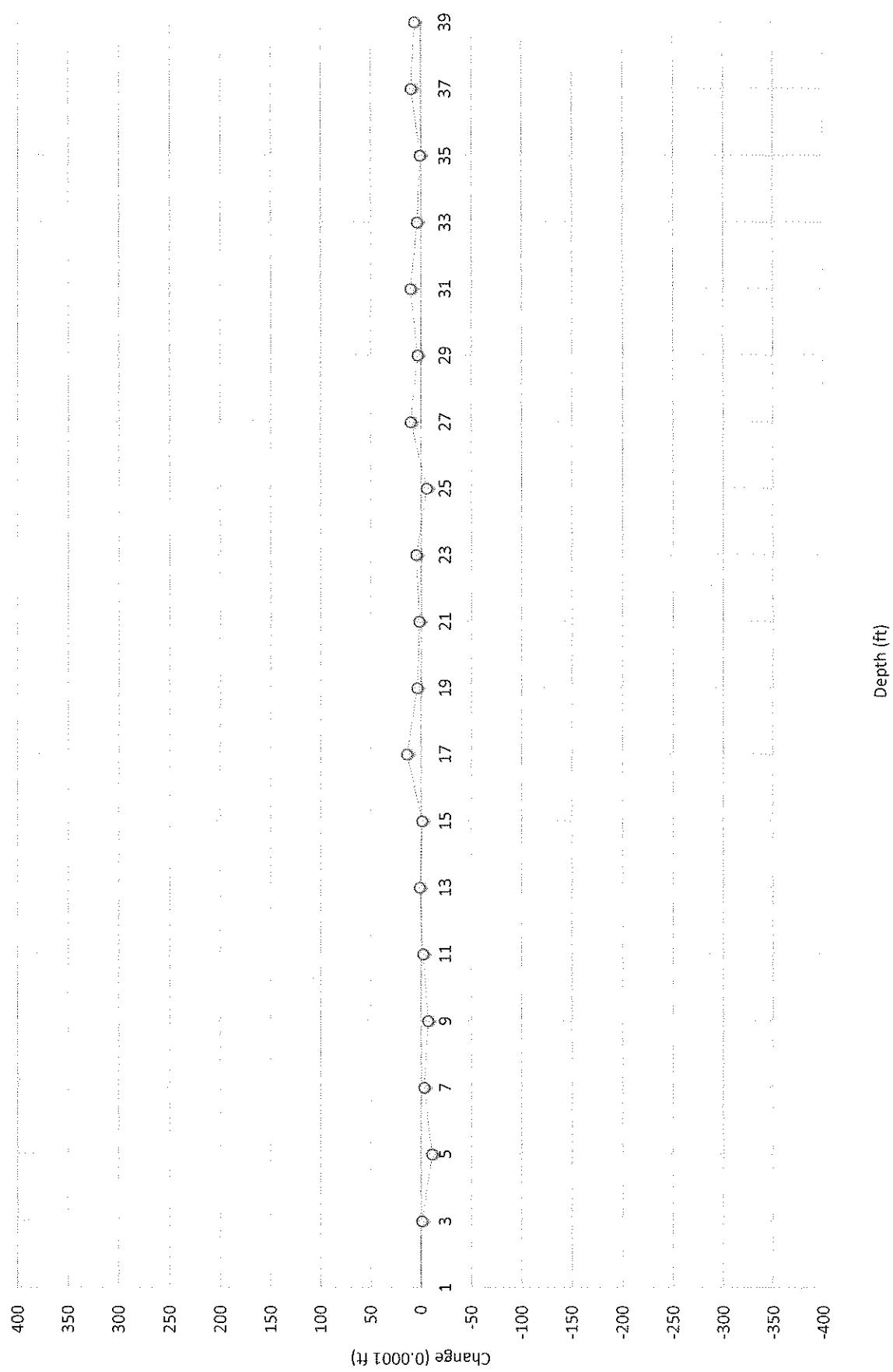
FIGURE 2

INSTRUMENTATION MONITORING FOR  
ARECIBO'S MUNICIPAL LANDFILL  
ARECIBO, PUERTO RICO

## Arencibo's Municipal Landfill

Inclinometer No. 2B (Bor. 5)

1/10/2018



**FIGURE 3**

Inclinometer 2 (Bor. 5) – Axis B  
Change Chart

Arecibo's Municipal Landfill  
Inclinometer No. 2A (Bor. 5)

1/10/2018

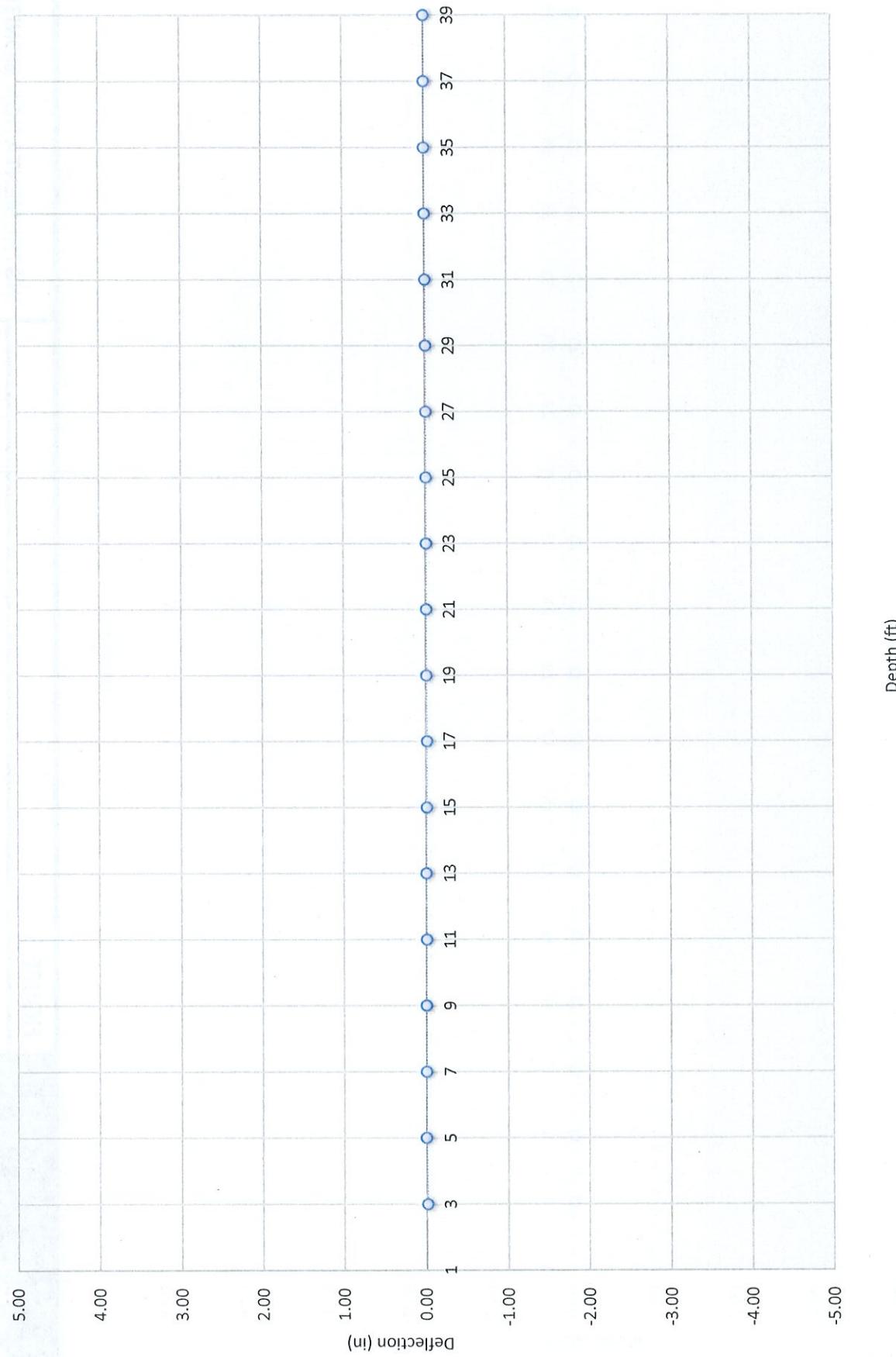
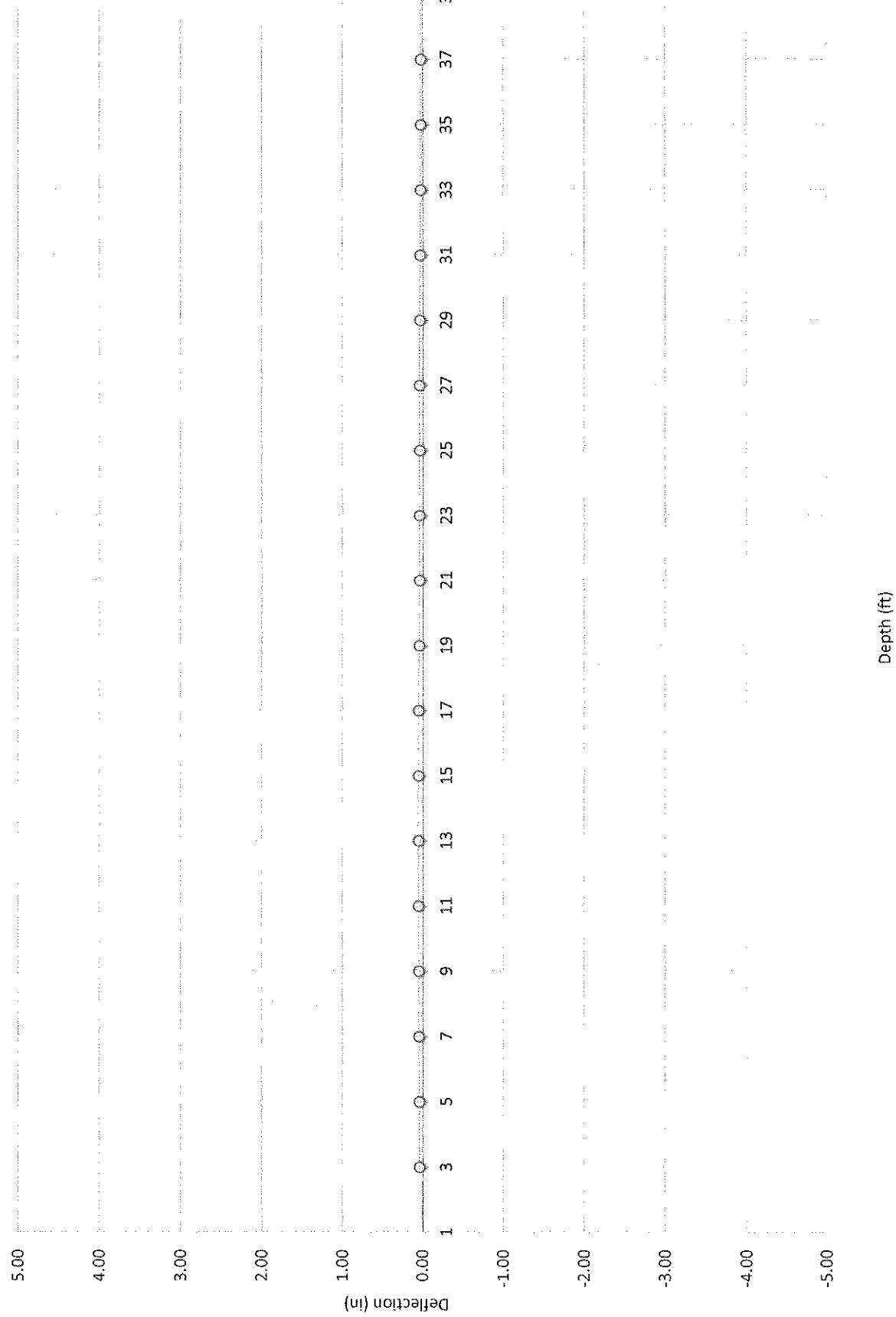


FIGURE 4

Inclinometer 2 (Bor. 5) – Axis A  
Deflection Chart

**Arencibo's Municipal Landfill**  
**Inclinometer No. 2B (Bor. 5)**

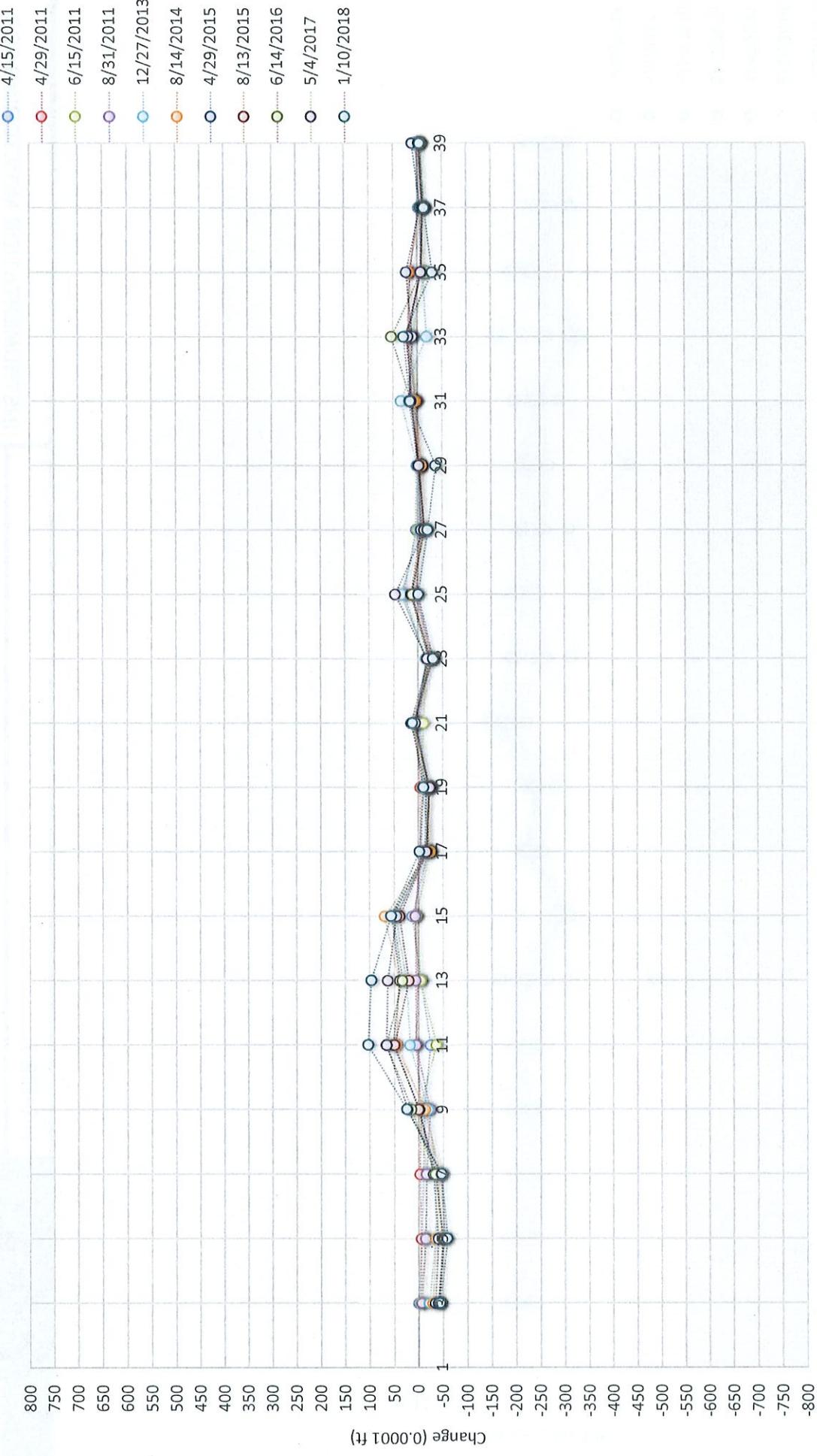
© 1/10/2018



**FIGURE 5**

**INSTRUMENTATION MONITORING FOR  
ARECIBO'S MUNICIPAL LANDFILL  
ARECIBO, PUERTO RICO**

**Arecibo's Municipal Landfill**  
Inclinometer No. 3A (Bor. 3)



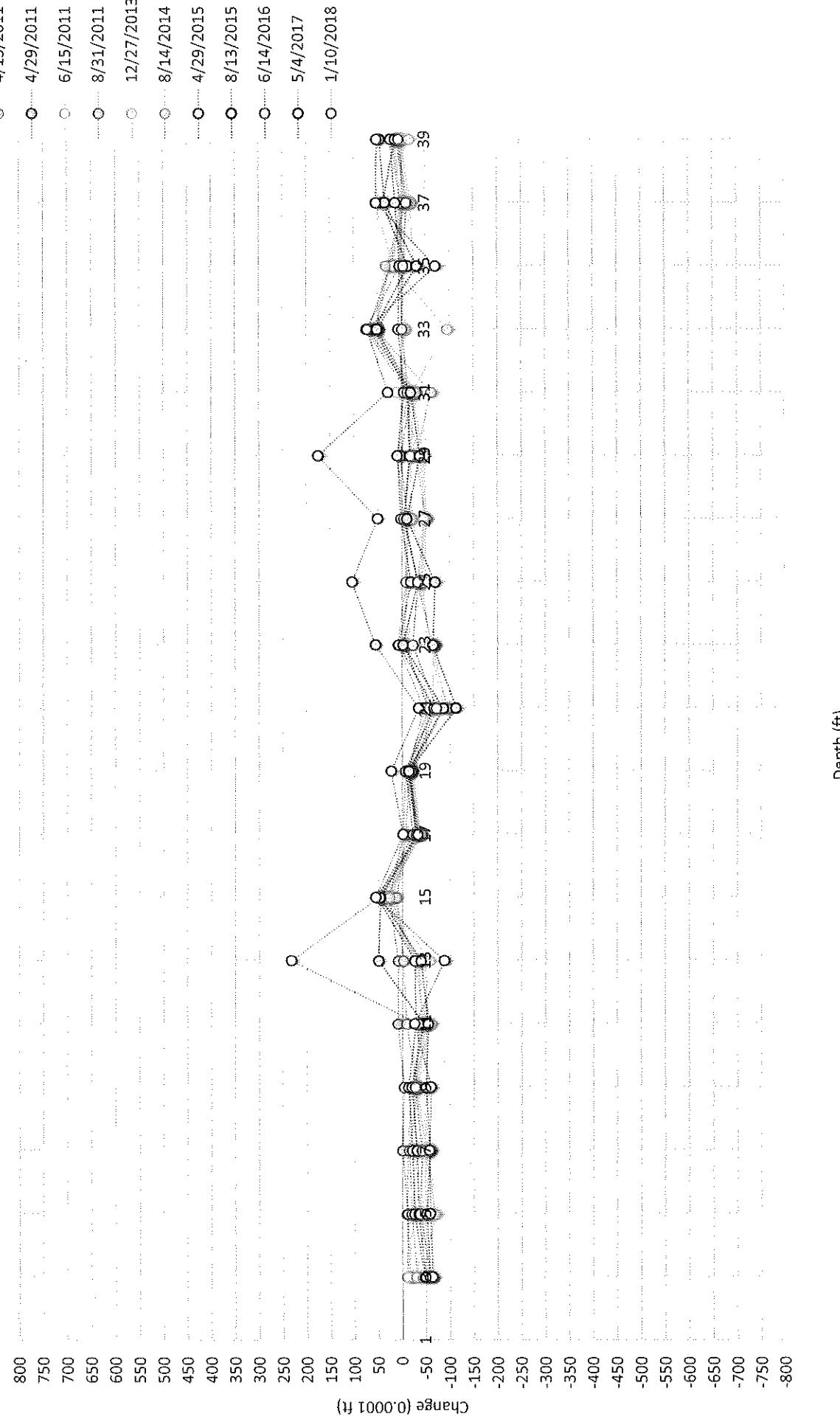
**FIGURE 6**  
Inclinometer 3 – Axis A  
Change Chart

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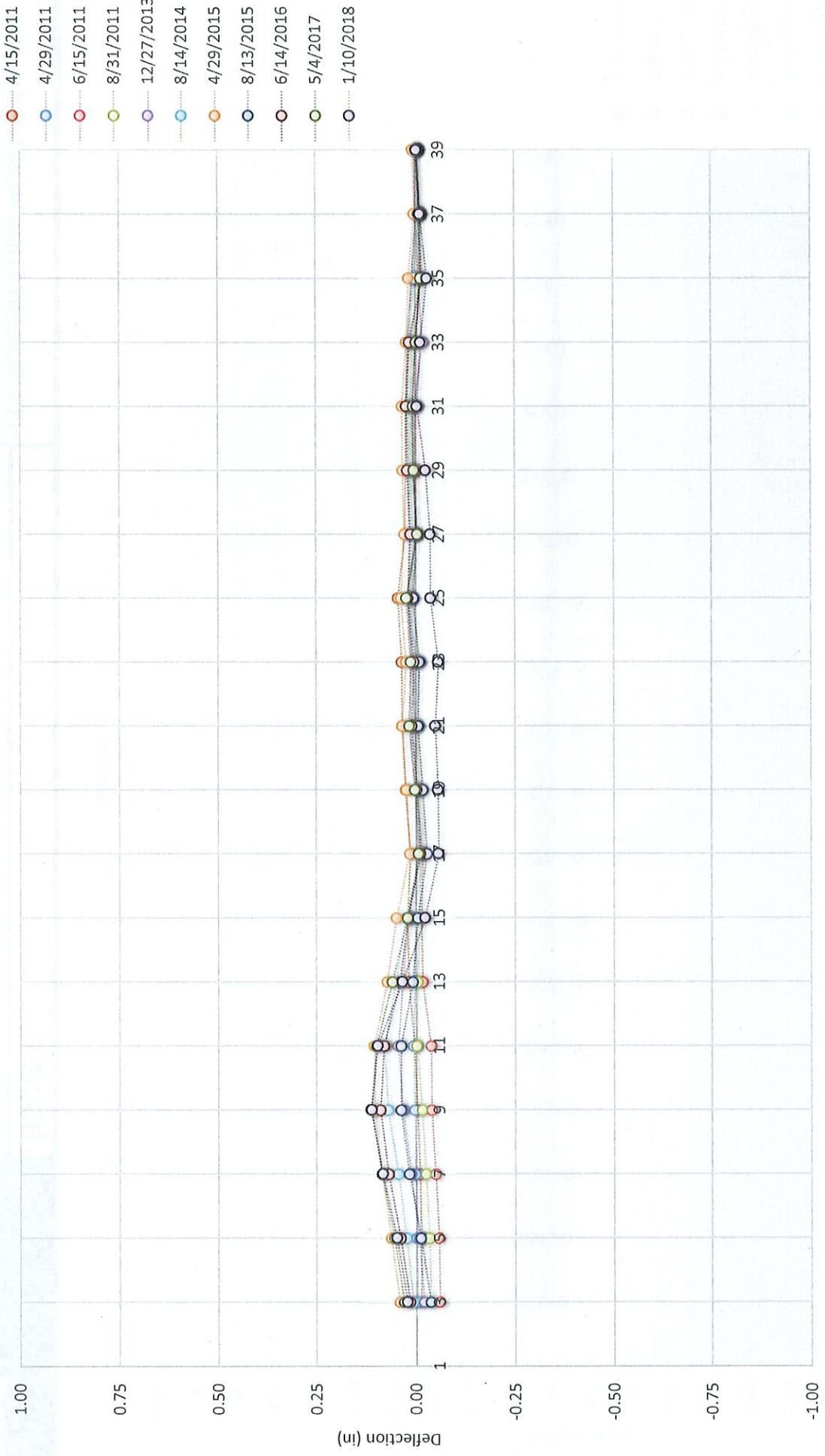
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**ARECIBO'S MUNICIPAL LANDFILL**  
**ARECIBO, PUERTO RICO**

**Arencibo's Municipal Landfill**  
Inclinometer No. 3B (Bor. 3)



**FIGURE 7**  
Inclinometer 3 – Axis B  
Change Chart

Arecibo's Municipal Landfill  
Inclinometer No. 3A (Bor. 3)



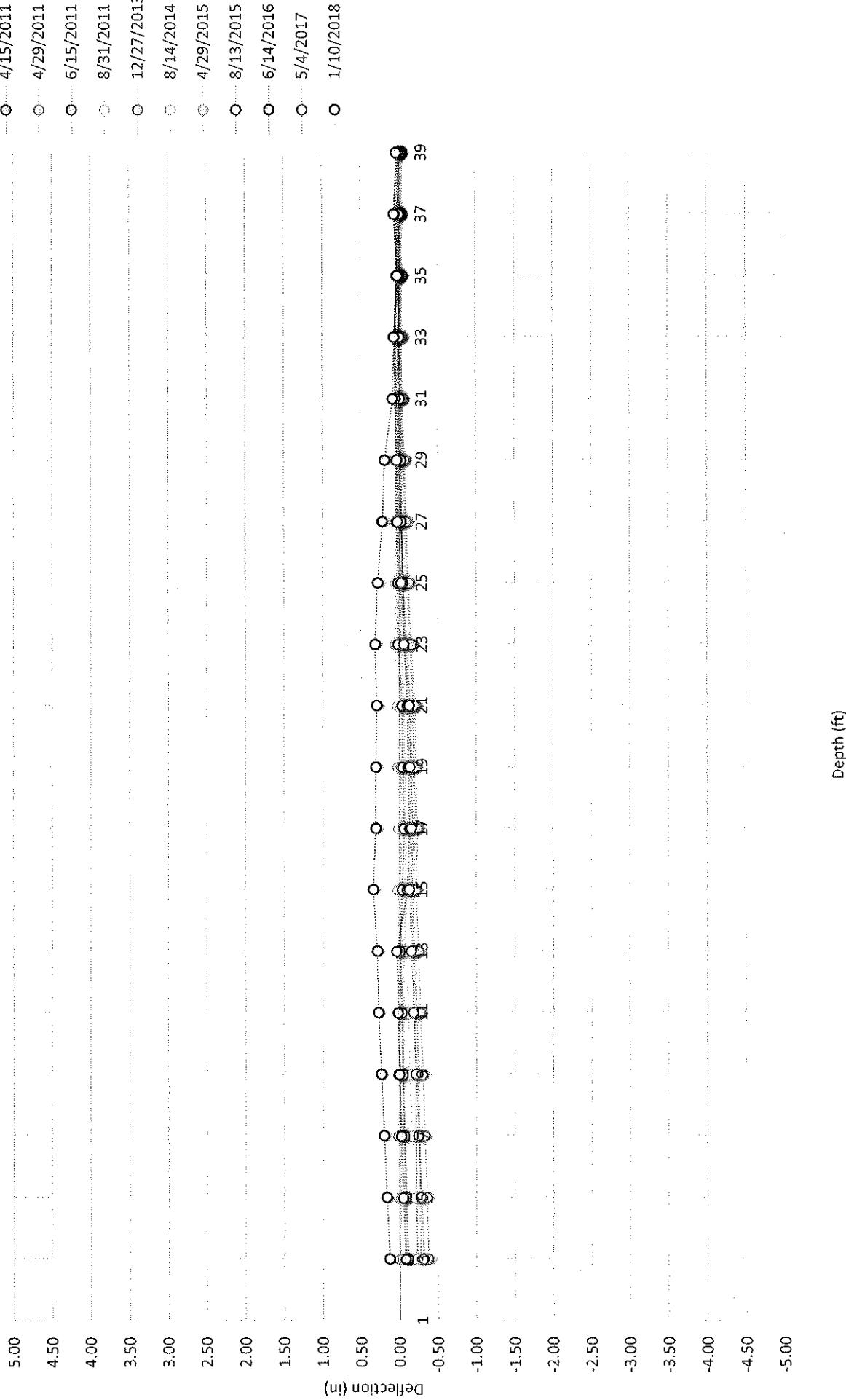
**FIGURE 8**  
Inclinometer 3 – Axis A  
Deflection Chart

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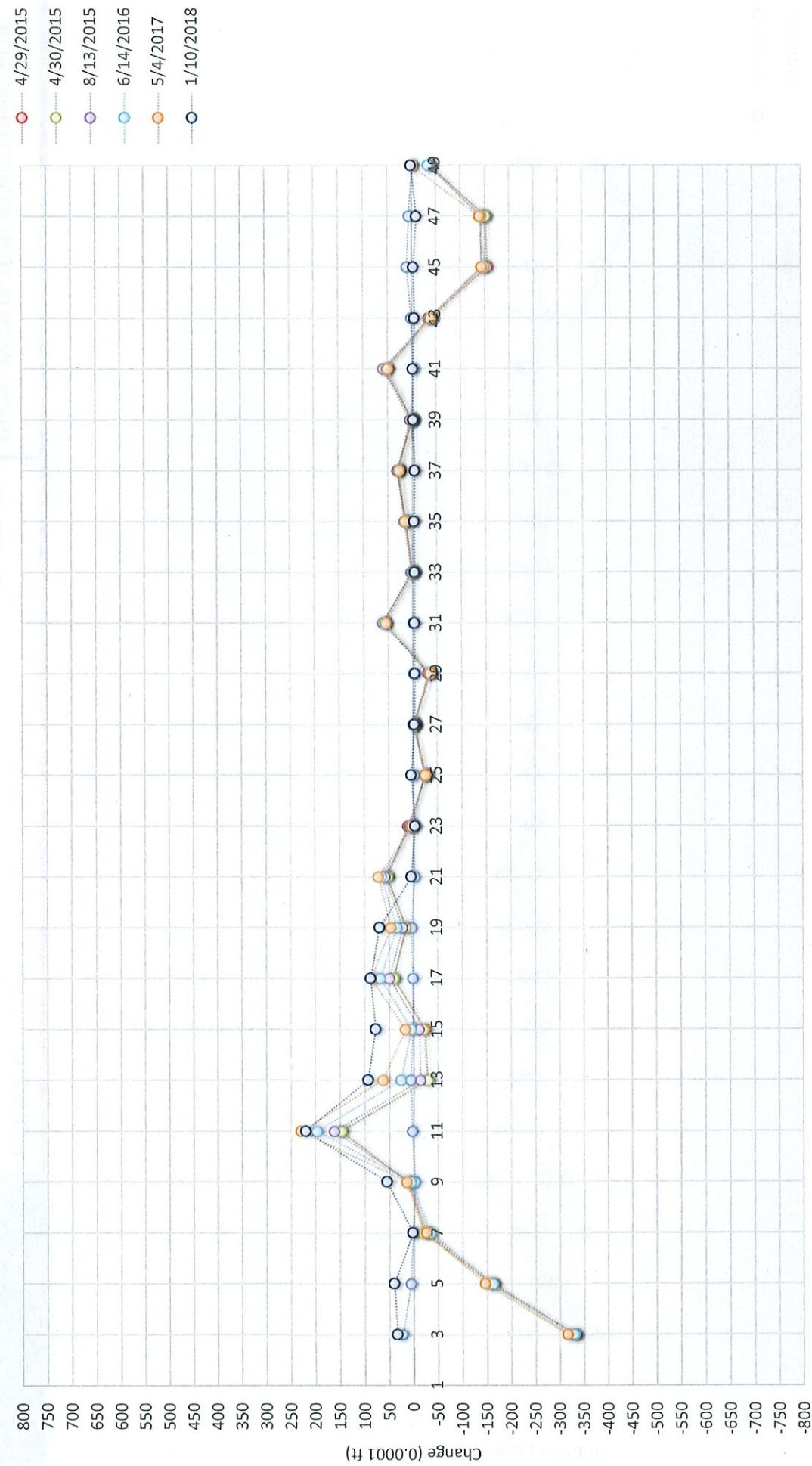
**INSTRUMENTATION MONITORING FOR**  
**ARECIBO'S MUNICIPAL LANDFILL**  
**ARECIBO, PUERTO RICO**

**Arecibo's Municipal Landfill**  
Inclinometer No. 3B (Bor. 3)



**FIGURE 9**  
Inclinometer 3 – Axis B  
Deflection Chart

Arecibo's Municipal Landfill  
Inclinometer No. 4A (Bor. 7)



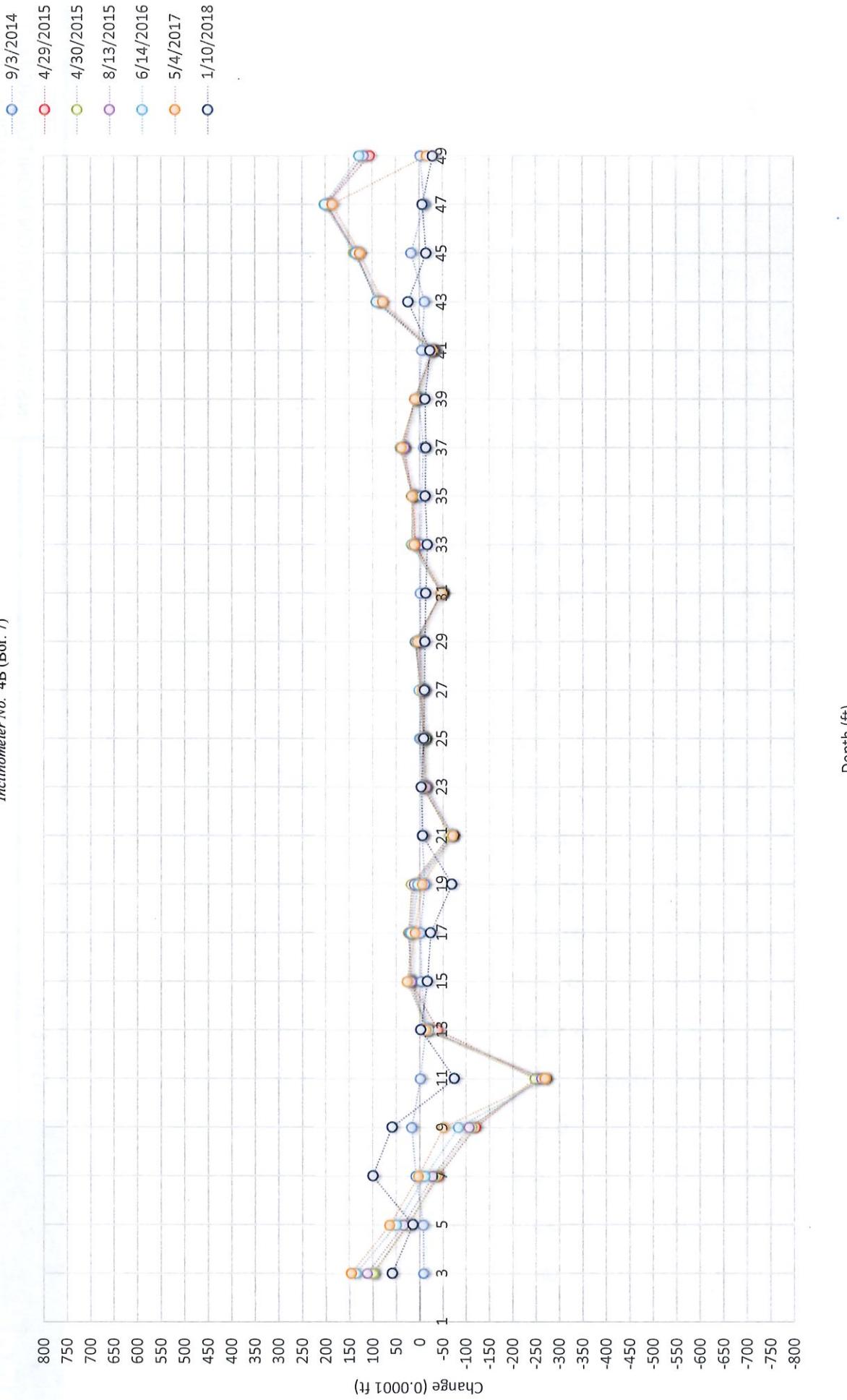
**FIGURE 10**  
Inclinometer 4 – Axis A  
Change Chart

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ARECIBO, PUERTO RICO

## Arecibo's Municipal Landfill

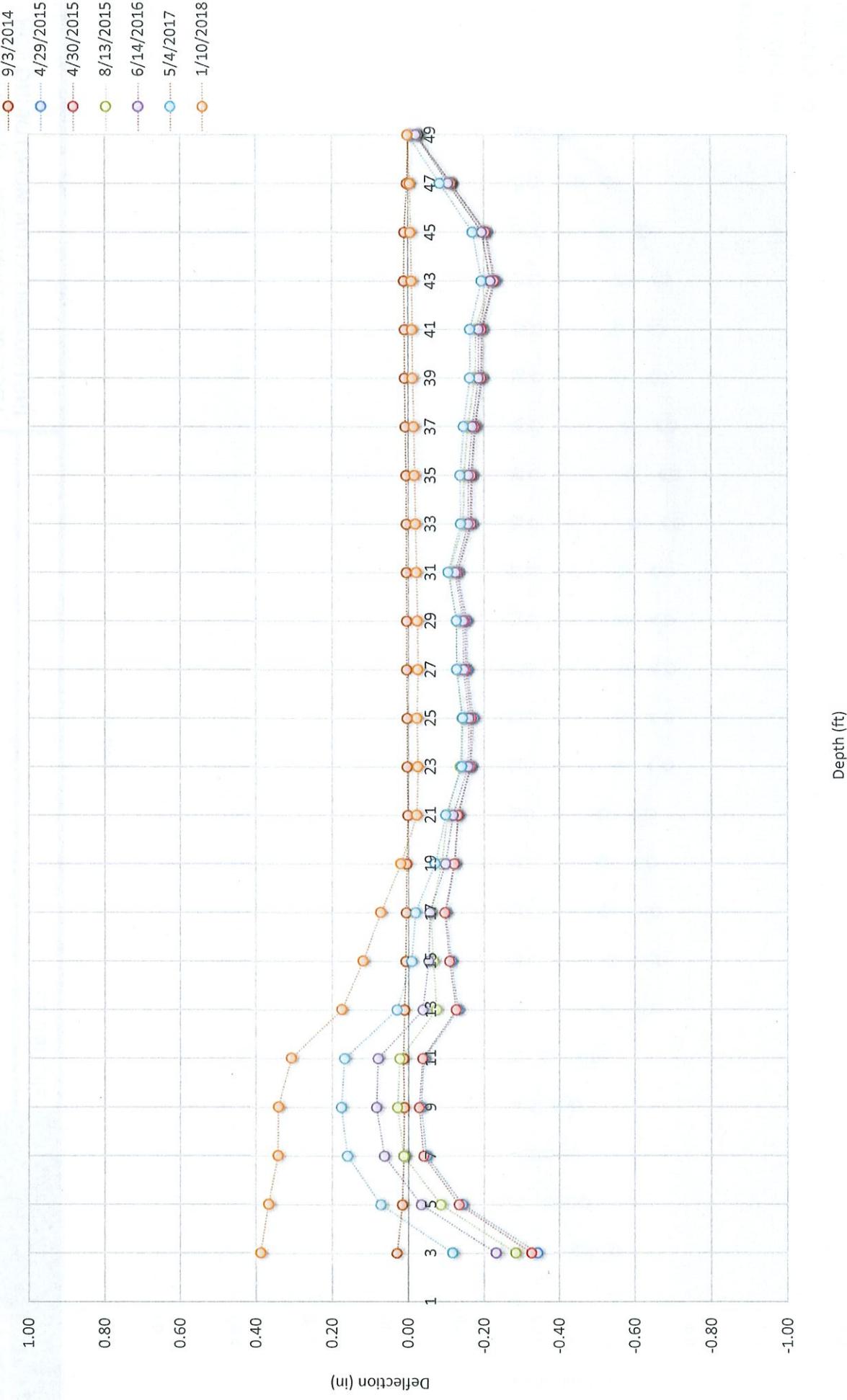
Inclinometer No. 4B (Bor. 7)



**FIGURE 11**  
Inclinometer 4 – Axis B  
Change Chart

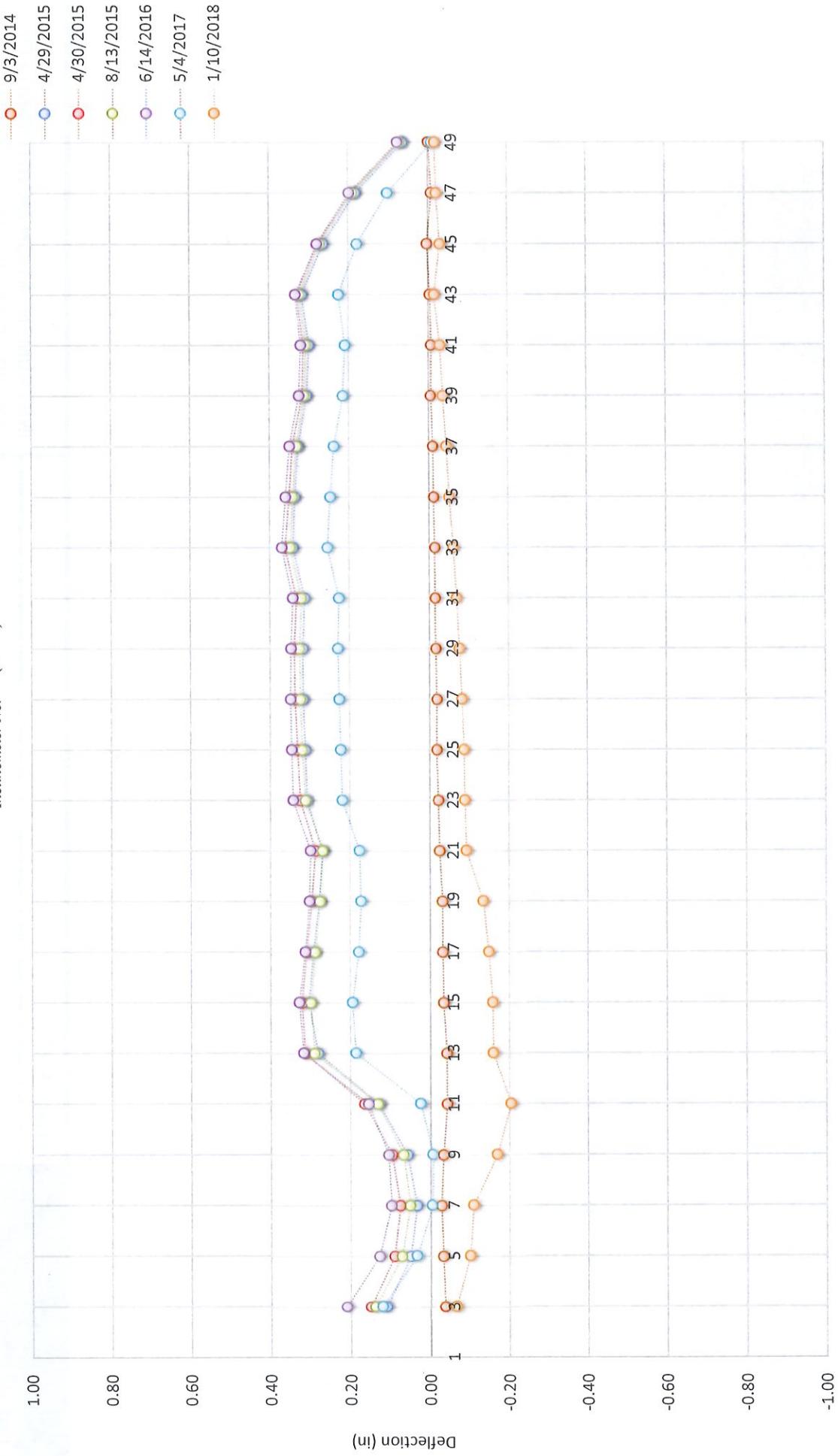
**INSTRUMENTATION MONITORING FOR**  
**ARECIBO'S MUNICIPAL LANDFILL**  
**ARECIBO, PUERTO RICO**

Arecibo's Municipal Landfill  
Inclinometer No. 4A (Bor. 7)



**FIGURE 12**  
Inclinometer 4 – Axis A  
Deflection Chart

**Arecibo's Municipal Landfill**  
*Inclinometer No. 4B (Bor. 7)*



**FIGURE 13**

Inclinometer 4 – Axis B  
Deflection Chart

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**INSTRUMENTATION MONITORING FOR**  
**ARECIBO'S MUNICIPAL LANDFILL**  
**ARECIBO, PUERTO RICO**

Project: Arecibo's Municipal Landfill				GEO   geotechnical engineering construction materials testing				
Date: 1/10/2018								
Inclinometer No. 2A (Bor. 5)								
Orientation of A-axis				Depth (ft):		45	Read:	2
Depth (ft)	Reading 1	Reading 2	Diff.	B - C	Initial	Change	G*.0006	Deflection
3.0	-698	695	3	-1393	-1367	-27	-0.0159	-0.0183
5.0	-678	666	12	-1344	-1348	4	0.0024	-0.0024
7.0	-803	801	2	-1604	-1605	1	0.0003	-0.0048
9.0	-925	919	6	-1844	-1852	8	0.0048	-0.0051
11.0	-1029	1026	3	-2055	-2051	-4	-0.0024	-0.0099
13.0	-1077	1076	1	-2153	-2163	10	0.006	-0.0075
15.0	-1152	1152	0	-2304	-2314	10	0.006	-0.0135
17.0	-1293	1299	6	-2592	-2585	-8	-0.0045	-0.0195
19.0	-1315	1312	3	-2627	-2625	-3	-0.0015	-0.0150
21.0	-1248	1244	4	-2492	-2496	4	0.0021	-0.0135
23.0	-1188	1185	3	-2373	-2370	-3	-0.0018	-0.0156
25.0	-1181	1180	1	-2361	-2359	-2	-0.0012	-0.0138
27.0	-1266	1270	4	-2536	-2538	2	0.0012	-0.0126
29.0	-1319	1321	2	-2640	-2636	-4	-0.0024	-0.0138
31.0	-1376	1376	0	-2752	-2740	-13	-0.0075	-0.0114
33.0	-1441	1439	2	-2880	-2877	-3	-0.0018	-0.0039
35.0	-1454	1454	0	-2908	-2909	1	0.0006	-0.0021
37.0	-1506	1509	3	-3015	-3016	1	0.0003	-0.0027
39.0	-1402	1403	1	-2805	-2806	1	0.0006	-0.0030
41.0	-1323	1323	0	-2646	-2657	11	0.0063	-0.0036
43.0	-1280	1281	1	-2561	-2542	-19	-0.0114	-0.0099
45.0	-1167	1160	7	-2327	-2330	3	0.0015	0.0015

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construction materials testing**

*Project:* Arecibo's Municipal Landfill

Date: 1/10/2018

*Inclinometer No. 4B (Bor. 7)*

### *Orientation of B-axis*

*Depth (ft):* 49

*Read:* 8

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